Microbiology case 10 objectives

***Klebsiella pneumoniae* (bacterial pneumonia)**

**signs and symptoms**:

cough, fever, night sweats,

chest pain

abundant thick, tenacious, blood-tinged (currant jelly) sputum;

12-lb. weight loss over 3 weeks;

rales and ronchi at the right lung base,

enlarged liver with mild tenderness

**manner of exposure, route of infection, tissues that they reside and, where appropriate, transmission to others**:

*Klebsiella* species are ubiquitous in nature

can form part of the intestinal flora in humans, with subsequent infections of the **urinary tract, the biliary tract, and wounds**

**pathology and the manner by which the particular disease develops and/or is induced, including damage caused by the pathogen and damage caused by the immune system’s response to the pathogen**:

*oropharyngeal carriage is associated with impaired host defenses in alcoholics*

bacteria gain access after the host aspirates colonizing oropharyngeal microbes into the lung

**bacteria adhere to target cells in the lower respiratory tract via the mediation of multiple adhesions**, each with distinct receptor specificity

adhesive properties are **generally mediated by different types of pili** on the bacterial surface

**a complex acidic capsular polysaccharide is the main determinant of virulence**

protect the bacterium from phagocytosis by PMNs

inhibits the activation or uptake of complement components, especially C3b

acute inflammatory infiltrates from bronchioles into adjacent alveoli that occur following infection of the lung **usually cause bronchopneumonia** (patchy distribution of opacity on chest x-ray involving one or more lobes)

long abscess caused by encapsulated bacteria in the polymicrobic infection results in **necrotic destruction of alveolar spaces, cavity formation, and production of blood-tinged sputum due to endothelial damage**

**methods of identification and placement into a particular biological subset**:

member of the family of *Enterobacteriaceae*

**short, plump, Gram negative bacilli**

lactose-fermenting, urease-positive, nonmotile, nonflagellated

prominent polysaccharide capule, outer membrane contains LPS

diagnostic work-up: blood cultures, sputum (Gram stain) examination and cultures

**factors leading to enhanced resistance or susceptibility**: alcoholics and people with seizure disorders at increased risk

**other organisms in the differential diagnosis and how to discriminate among potential causative agents**:

*H. influenzae*, *Legionella pneumophila*, *M. tuberculosis*, *S. aureus*, *S. pneumoniae*

clinical diagnosis of pneumonia should be considered

presence of cavitary lesions often implies an abscess with polymicrobial infection although TB is also an important consideration

*K. pneumoniae* is one of the more common causes of pneumonia in the homeless population; pneumococcal and staphylococcal pneumonias are commonly community acquired

homelessness should generally prompt ruling out TB

**prevention, treatment and vaccine design (live vs. dead**):

**prevention**: no vaccines or hyperimmune sera are available; risk avoidance is an important measure of prevention

**treatment**: extended-spectrum penicillins, aminoglycosides, quinolones, and other antibiotics are useful for treatment of pneumonia and a variety of other infections due to *Klebsiella* species

newer generation cephalosporins have also been widely used in combination with aminoglycosides

high mortality rate, even with adequate therapy

prognosis is worse in patients with alcoholism and bacteremia